Grasping the mobile opportunity

The oil & gas industry must mobilise enterprise data if it is to tackle the challenges that lie ahead.

From faster turnarounds to tackling the skills shortage, mobility may hold the key to boosting competitiveness, improving safety and getting the most out of existing IT investments. Can your enterprise really afford to ignore this opportunity?

Despite the now ubiquitous presence of IT in business, the oil & gas sector has been slow to put new technology – specifically, mobile technology – into the hands of the workforce. This cautious approach is understandable: there seems to be a reluctance to diverge from established ways of working in an industry where safety is paramount.

That attitude is beginning to change. Mobile technology is now firmly established in equally traditional industries: aviation, railways and shipping have all replaced paper-based processes with mobile in safety-critical applications.

Mobile is attractive because it provides a means to increase productivity and to get more out of existing investments in people, IT and physical infrastructure, as well as promoting safety. The ability to drive productivity, update critical information systems in real time and share information all have the capacity to revolutionise the way work is carried out.

CURRENT SITUATION

The industry's ability to tackle the challenges that lie ahead will increasingly hinge on the deployment of the right mobile technologies to gather and share information.

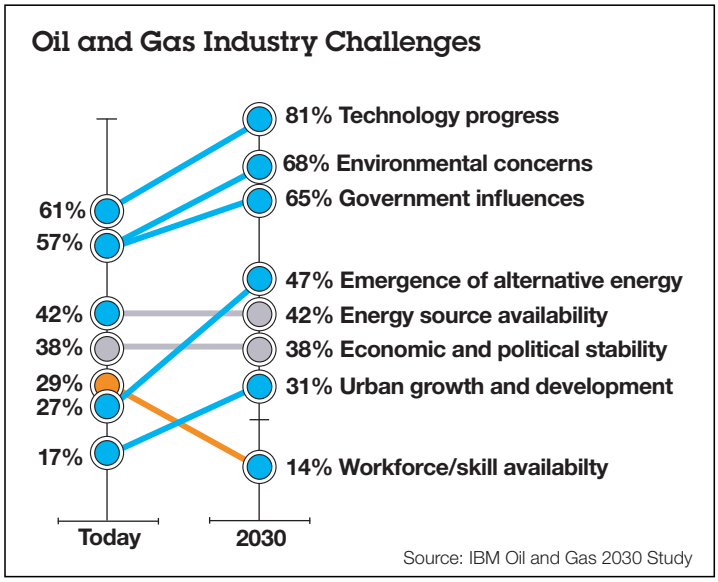
The digital oilfield is already a reality. Global oil & gas IT spend was $37.6bn in 2011 and it is forecast to rise to $49.4bn by 2016.[1] Most of the investments to date have been made in back-office systems. To get the most out of these investments and to share insights with everybody who needs them, the industry faces an urgent need to develop user-facing mobile technologies.

Enterprise data is too valuable to lock away. Between a quarter and a third of the total value generated each year by all the activities of a typical exploration and production company is contributed by data.[2] Mobile democratises access to data and puts it into the hands of those who need it most, when they need it most.

The era of easy oil & gas is over. Unconventional "tight" oil and shale gas, for example, now accounts for nearly 50 per cent of US production[3] – up from nothing just five years ago. Resources in remote, decentralised locations demand new ways of operating, including the ability to access and share real-time data to optimise production and reduce risk. Yet the industry still struggles to get the right information to the right people at the right time.

Monitoring assets is an increasing challenge. Oil & gas businesses need cost-effective condition monitoring and tracking technologies to manage assets that are not only growing in number and complexity, but are also increasingly scattered. Real-time tracking and optimisation solutions are needed to make the best use of field resources, equipment and people.

Transparency is a necessity, not a luxury. The industry faces an increasing need to provide timely and accurate information to meet regulatory and legal obligations. Governance, risk and compliance management depend on the efficient capture, dissemination and visibility of



Oil and Gas executives expected shifting impacts from a multitude of external forces over the next two decades.

information. Mobile applications make this possible, without hindering employees in their work.

Downtime is money. Shutdowns and turnarounds are vital parts of the asset lifecycle, but they come at a cost – not only for oil & gas businesses, but also for the wider economy. Seasonal oil & gas shutdowns in the UK, for example, contributed to a 0.5 per cent fall in national industrial output in June 2010.[4] In 2011, oil production was down 19 per cent, the largest recorded for the UK continental shelf since production peaked at the turn of the century. Ten large fields made up 37 per cent of the reduction and of those, three were the result of maintenance shutdowns.[5] Mobile tools are needed to boost the efficiency of maintenance operations, ensuring shutdowns are kept as short as possible while maintaining the highest safety standards.

Environment, health and safety management is critical to the sector. The spectrum of responsibility in the industry ranges from the promotion of safe working practices to the protection of the environment. Knowledge transfer and information visibility are key enablers to support the shift from compliance to prevention.

Skills are in short supply. In a recent industry survey, 47 per cent of respondents said they considered the shortage of skilled professionals to be the top barrier to growth.[6] The ability to share industry knowledge easily using mobile platforms is likely to become increasingly important.

Consolidation is driving the need for better communications. Tighter regulation, rising costs and the need to acquire specialist skills continue to spur consolidation within the industry. Getting the most out of mergers, acquisitions and partnerships will increasingly depend on seamless communications and an ability to share information as enterprises reorganise. Yet the oil & gas industry often struggles to share the right data with the right people.

The industry remains largely paper based. Many oil & gas businesses have yet to reap the full benefits of shifting away from paper-based processes. In cases where electronic processes have been adopted, these have simply replicated the workflows electronically, without a deeper transformation of the underlying workflows. Mobile is not simply a replacement technology, it is an entirely new way of operating.

HOW MOBILITY ENABLES CHANGE

Given the environment in which oil & gas is currently operating – where maintenance downtime cuts into company profits, skilled employees are a challenge to find and paper still plays such an important part in the process – why should the sector make the effort to implement a mobility strategy?

Shifting to mobile has the potential to revolutionise productivity, safety and efficiency. It could also offer rapid ROI: when an oil & gas company implements a smart maintenance project, for example, it could pay for itself by avoiding costly delays in production during turnaround maintenance.

Maintenance excellence

Shutting down a plant for a planned overhaul can come at a high cost in terms of lost production. Smart maintenance, enabled by mobile, is designed to get the most out of shutdowns, boosting wrench time and ensuring the workforce is always productively and safely deployed throughout the turnaround.

This is achieved through smarter allocation of resources using mobile devices. The assignment of work orders and deployment of staff – and real-time reallocation of workers as soon as jobs are completed – ensures that not a moment is wasted. Proximity functions mean workers waste

less time travelling between jobs. Work can be supervised centrally, in real time, with faster information flows making it possible to bring sections of plant back online as soon as they are ready.

Mobility also has the potential to transform maintenance safety. Pipeline shutdowns are an example: the ability to scan tags on pipe flange joints and on the blanking spades used to provide positive pipe shut off provides positive digital confirmation that a section of pipeline is safe to work on.

Mobile systems can also spot when a worker has moved beyond a safe distance from a designated colleague in situations that mandate working with a partner for safety. And it allows supervisors to deliver targeted alarms to individual workers – vital in an industry where installations may cover an area the size of a small city.

Production excellence

Replacing pens and clipboards with mobile devices transforms the way production data is gathered and shared. Digital capture eliminates double handling: instead of writing down readings in the field and then going back to a workstation and keying them in again, data is captured once and in real time.

This not only reduces trips and workload, it also eliminates transcription errors when data is keyed in to the main system. Readings captured in the field can be made instantly available to people who need them.

Capability assessments

A typical workforce will contain a wide array of skills and levels of competence. Ensuring that the right people are matched to the right tasks and guaranteeing the right level of supervision are constant headaches for the industry. The challenge is acute during turnarounds, where every second counts and resources are often stretched to the limit.

In many geographies, these intensive turnaround efforts are supported by third party contractors and the need to verify that the right crafts and skills are on site for the day's activities becomes even more challenging. Mobile capabilities can ensure these variable workforce patterns are co-ordinated and orchestrated to execute the work with minimal delay.

Capability assessment ensures that the right work orders are digitally allocated to the right people and that the right supervision regime is in place to verify that work has been carried out correctly. This is achieved via a back-end system that is continuously updated, with a work and skills profile for each employee and real-time knowledge about the task in hand.

By tracking tasks and staff in real time, it is possible to match a specific job with the nearest appropriate supervisor – a vital time-saver when work needs to be independently inspected and signed-off on completion.

Smarter permitting

Permitting – the system used to control potentially hazardous work – is fundamental to safe operations and maintenance in

Mobilising Oil & Gas

1. Create a business case for your mobile technology plans that recognises financial and risk avoidance benefits. Aim to include multiple business units to gain a greater return on investment for consolidated mobile solutions.

2. Build the infrastructure that will allow the adoption of mobile technology to flourish. This includes hardware provisioning services, development platforms and support services.

3. Learn from other industries. Leaders include retail for inventory management and utilities for workflow management. They may not share all the challenges of the oil & gas industry, but they have proved the benefits that can be delivered.

4. Don't try to accurately predict the shape of mobile technology. The area is so fast-moving that a three to four-year prediction is the maximum that can be reasonably envisaged.

5. Work with business partners that are experienced, respected in the industry, have global reach and can service a wide range of mobile technology needs.

oil & gas. A permit authorises certain people to carry out specific work at designated times and places, and sets out the precautions needed to get the job done safely.

Electronic permitting overcomes the limitations inherent in conventional paper-driven systems. By shifting to digital, it becomes possible to integrate permitting with other relevant systems, including maintenance and capability assessments. Matching the person to the job is therefore easier and more certain.

Mobility adds additional layers of assurance and transforms the visibility of work being carried out: staff can be tracked and tasks monitored centrally in real time, so supervisors know exactly what work is being carried out, where, when and by whom. Actions can be logged and reviewed – a vital capability in the event of an incident.

Compliance and audit

Mobile opens up the opportunity to apply strict validation and enforcement in the way processes are carried out. Validation and enforcement logic can be encoded both into mobile applications and in business process management software to ensure compliance.

Equally important is the ability to extract and report on compliance and audit information captured during the inspection process by employees. This data is not only valuable for internal and external compliance, but also enables the organisation to identify constraints on people, processes and technology. These mobile-enabled capabilities assist in the development of "self compliance" models, in which business principles, process safety and commercial standards are aligned.

Information visualisation

Oil & gas operations generate vast amounts of data, from complex 3D and 4D seismic analyses to pipeline telemetry data. All of this must be transformed into usable business information and then distilled to support decision-making processes.

High-performance connected devices not only make information more widely available, but also enhance the user experience while reducing the burden on the servers providing the data. Smart user-focused applications reduce information overload, making it easy to take intelligent business decisions.

Knowledge management

Mobile provides anywhere, anytime access to engineering data, manuals and processes. Tablet devices with bright, retina-quality screens are a valuable tool in the field, particularly for their ability to store large amounts of data securely. Applications can be designed to work transparently in offline mode – essential in remote environments where connectivity may be intermittent or non-existent.

As well as disseminating centrally-held information, mobile enables collaboration. Social business tools allow users to interact via blogs, wikis and messaging services. The combination of social computing and mobile has huge potential to drive productivity, efficiency and safety improvements.

There are a number of cases where such capabilities can add immediate value. For example, an engineer can initiate a real-time chat with peers anywhere in the world to resolve a problem. The ability to work collaboratively provides a valuable way to make scarce skills go further, vital in an industry where talent and expertise are in increasingly short supply.

Location and tracking

Technological innovation around mobile devices and location capabilities have reignited interest in tracking solutions in the last few years. The availability of high-performance smartphones with GPS, Wi-Fi, NFC and Bluetooth enables them to perform more of the computation required to determine location. Earlier location and tracking technologies relied on complex and expensive proprietary reader-and-tag configurations.

Mobile devices play an important part in industry tracking solutions, both for tracking people (when the device is carried) and as a means of viewing information about the location of the device itself – as well as the location of other people and devices. Location information is correlated with information from other systems to provide intelligent, location-aware applications, which can contribute to the safety of employees under challenging conditions.

Oil & Gas Mobile Capabilities

The Internet of Things (IoT)

In the IoT universe, every real-world object is uniquely addressable and allows two-way communication between itself and other physical objects (machine-to-machine or M2M), including people and technology.

The oil & gas industry already has considerable experience in RFID (radio tagging), M2M and thus IoT technologies. RFID and M2M play a major part in meeting asset management and telemetry requirements – IoT can be considered an evolution of these technologies.

Whereas traditional RFID and M2M technologies have been considered niche, complex and expensive to implement, IoT technologies may deliver cost-effective and powerful solutions to meet key industry challenges in the future.

Mobile is central to this vision: mobile devices not only act as IoT transmitters or beacons, they also serve as receivers for IoT information, such as location and telemetry data. This means it may be possible to deploy low-cost battery-powered beacons as small as a coin to enable identification and location awareness in assets. Provided the right security policies are implemented, this makes it possible to track just about any asset within the organisation.

Message Queuing Telemetry Transport is a lightweight messaging protocol being positioned as the recommended method of communication for IoT device networks. It is designed for use over battery constrained and low-latency networks, typically those connecting M2M, telemetry and sensor device networks. Oil & gas examples of its use include the remote monitoring of devices across petroleum pipelines.

Wearable technologies

Devices such as smart watches and other "wearable" technology can enhance conventional computing devices by improving human interaction without the constraints that traditional input devices may have.

Wearable technologies hint at a future where human-computer interaction can be used to improve productivity, such as site inspections where information is transmitted and received simply by looking at an asset. This could be coupled with QR codes or RFID for improved accuracy.

$49.4bn

is the forecast IT spend by the oil & gas sector by 2016, up from $37.6bn in 2011.

WHERE NEXT?

The greatest challenge in embracing mobility is deciding where to start the journey. For mobile innovation programmes in industries such as oil & gas, there is demonstrable value in aligning different opportunities with each other at an early stage because there are often significant overlaps and therefore synergies.

Although a minor degree of extra effort is required to manage these overlaps, there is more than measurable payback in terms of added value and in the elimination of mobile application silos.

Prioritising investment in the development and deployment of mobile solutions must be based on robust business cases. However, organisations should avoid attempting to predict what applications will be of most use more than a few years into the future. In such a fast moving environment, solutions should be allowed to emerge organically where possible and practical. The organisation must ensure that this is achieved within the context of an overall reference architecture.

Hardware is developing rapidly. The panacea is a device that is "ruggedised" and intrinsically safe. Rugged hand-held devices that can be operated in ATEX Zone 1 environments are available, albeit typically running older versions of Windows rather than Android or iOS and therefore falling short of the functionality associated with consumer devices. Oil & gas companies are also likely to have a legacy estate with siloed applications.

Form factor is critical. The size of the screen and the quality of the user experience offered by a mobile device will be just as important as the quality of the applications if an initiative is to be successful. If a device intended for use in the field cannot be used with gloves on, for example, it is likely to be of little use.

Device provisioning must be managed carefully. A company wishing to stay at the forefront of mobile possibilities must be capable of managing devices through their lifecycle and to replace or update them cost effectively. In non-safety critical applications, organisations will need to consider supporting a BYOD (bring your own device) policy.

Support services for users should be offered and provide a single point of contact for assistance.

The technologies used for mobile working are merging and the user is unlikely to benefit from having different support processes in place for different types of devices and applications. An integrated approach to supporting and managing these is essential.

Rigour in solution development is critical. When regular enterprise systems are being chosen and developed, organisations deploy a robust selection and development methodology, including a release schedule and formal testing plan. While people expect mobile apps to be developed and delivered much faster these days, there is no less need to apply such rigour to mobile solutions, especially when employee safety is concerned. Organisations need the right development tools and testing toolsets to facilitate this, but their relatively small-scale deployment to date leaves many organisations failing to follow these guidelines.

HOW IBM CAN HELP

IBM provides end-to-end total mobility solutions for the oil & gas industry. These embrace everything from strategic consulting and workshops to help you to identify the mobile opportunity, to platform development and software solutions that deliver measurable results.

IBM MobileFirst

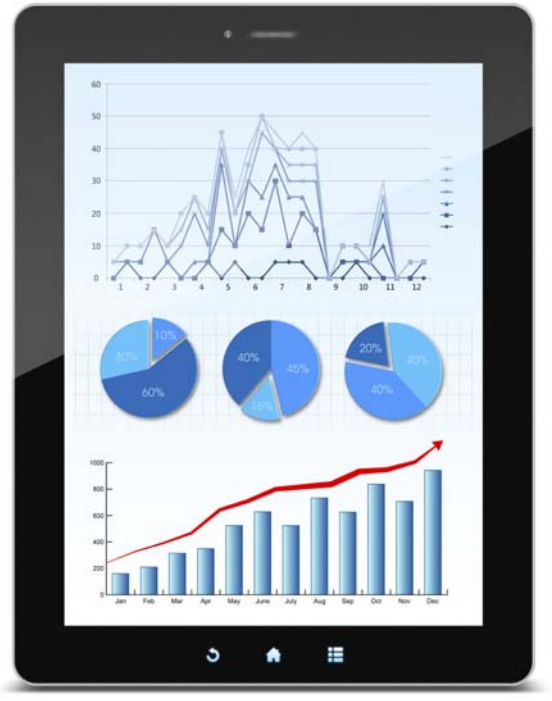
A unique and comprehensive offer that allows oil & gas enterprises to engage with every aspect of mobile development, deployment and security. It includes:

IBM MobileFirst Platform

- Develop and deploy high-quality mobile apps across multiple platforms quickly.
- Seamlessly connect those applications to enterprise data and services.

IBM MobileFirst Management

- Implement BYOD with confidence.
- Manage secure sensitive data, regardless of the device.
- Manage, track and optimise mobile expenses.
- Handle multi-platform complexities with ease.



IBM MobileFirst Security

- Protect devices, data and networks.
- Ensure secure access.
- Safeguard mobile apps.
- Preserve user experience without compromising security.

IBM MobileFirst Analytics

- Optimise digital and mobile experiences to drive online conversion.
- Analyse mobile behaviours and quantify the business impact of user struggles.

IBM MobileFirst Strategy & Design Services

- Ensure mobile projects yield measurable business value.
- Link mobile investments to ROI and IT strategy.
- Establish plans for growth and maturity of mobile initiatives.

IBM Maximo Anywhere

Maximo Anywhere is a next-generation mobile solution that integrates capabilities from all of our asset and facility management solutions, providing a single-vendor product for improving productivity in the field. Benefits for the oil & gas industry include:

- Instant mobile access to asset and work-related data with integrated capabilities from all of our asset and facility management solutions.
- Ability to leverage device-specific capabilities and improve productivity in the field with next-generation mobile tools.
- Offline capability enabling users to continue working, even while disconnected.
- Customisable user interface to meet organisational requirements and create tailored applications, leveraging IBM Worklight.
- Ensure regulatory compliance with capture of critical data at the point of execution.

IBM recognises that the oil & gas industry has a huge legacy estate in terms of devices and platforms. We are therefore platform agnostic. IBM provides mobile solutions to meet any industry need, using any device and any platform.

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